

QUARTERLY REVIEW

Vol. 1, No. 3

GEOLOGIC INVESTIGATION IN THE STATE OF UTAH

February, 1965

A SOUTHERN UTAH COAL START?

Will it go? Will it grow?

Southern Utah has Cretaceous coal, and lots of it. Approximately 2,500 square miles of the region contain five coal fields: the Kaiparowits (1,500 sq. miles), Henry Mountains (500 sq. miles), Kolob (400 sq. miles), Kanab (200 sq. miles), and Harmony (several square miles).

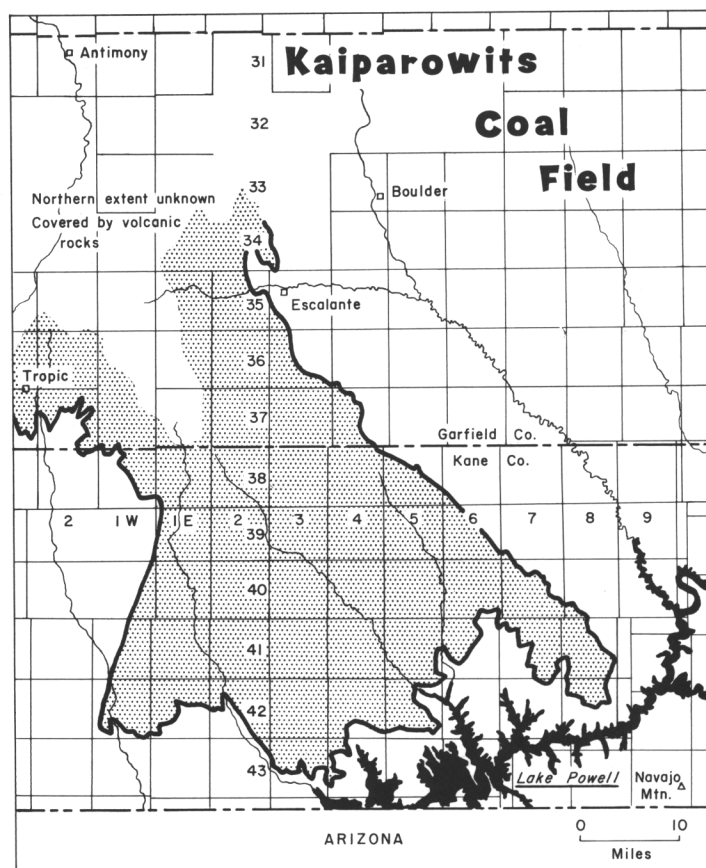
In 1962 the Resources Company of Phoenix, Arizona, and its associates, The Associated Southern Investment, Mono Power, and New Albion Resources Company, initiated a three-phase investigation of their 45,558-acre holdings (39,348 acres Federal and 6,210 State Land) in the Kaiparowits coal field of central Kane County. Phase 1, a geologic investigation and 10-hole drilling program, was completed early in 1964. Phase 2, a program of 30 additional core holes that were designed to confirm the geologic data and to refine the projections indicated from Phase 1 work, is now in its final stages. Phase 3, dependent on the availability of Colorado River water from Lake Powell, will involve more control drilling and

the establishment of a test mine for determining which types of mining methods and equipment will be most economically suited to the area.

If Lake Powell water were assured, and if Phase 3 should prove the feasibility of mining, ultimately the Resources Company and its associates will develop a steam-electric power complex capable of generating 5,000 megawatts of electricity, larger than any steam plant now in operation in North America.

The power complex is tentatively programmed to be constructed in units of 750 megawatts. At least four such units will be in operation; two 1,000 mw units are planned. Such a complex will be supported by an eight-mine system, each with a daily output of 8,100 tons for an aggregate capacity of 64,800 tons per day. The plant will require 14,600,000 tons of coal per year. Such a production obtained solely from federal lands could mean

Continued on Page 7, Column 1



QUARTERLY REVIEW

State of Utah.....Calvin L. Rampton
Governor

University of Utah.....James C. Fletcher
President

College of Mines & Mineral
Industries.....Armand J. Eardley
Dean

Utah Geological & Mineralogical
SurveyWilliam P. Hewitt
Director

UTAH GEOLOGICAL AND
MINERALOGICAL SURVEY
103 Civil Engineering Building
University of Utah
Salt Lake City, Utah
84112

THE ROLE OF WATER IN THE MINERAL INDUSTRY

Today and in the future the availability of water could be one of the most critical factors in the development and utilization of minerals.

Tomorrow's mineral demands will be coupled to high volume operations and, as such, large low-grade ore deposits will be of commercial significance. Unless there are significant technological advances, the availability of water will become critical because most present concentrating methods use large quantities of water.

Most processes which involve the utilization of the solid and semi-solid fossil fuels (coal, gilsonite, heavy waxes, asphalts, and oil shales) will utilize some water in exploitation and large amounts in processing because hydrogenation is needed to up-grade the hydrocarbon usable product, and the most ready source of hydrogen is water.

As an example: If our present daily domestic needs of 10.23 million barrels of petroleum products were supplied by oils from Utah or the Tri-State oil shales, over, 1,045,000 acre-feet of water would be used annually (a 10,000 bbl per day shale oil refinery would require 2.8 acre-feet of water per day). Further, if the domestic demand was satisfied by coal hydrogenation, approximately 8,740,000 acre-feet of water would be needed annually (a 10,000 bbl per day coal hydrogenation facility would use 23.4 acre-feet of water per day). Also if the domestic demand were supplied by bituminous sandstone operations, about 2,165,000 acre-feet of water would be required annually (a 10,000 bbl per day operation would require about 5.8 acre-feet of water per day).

It is interesting to note that far less than half of the annual 6,644,000 acre-feet of water allocated to the Upper Colorado River Basin States will be available for development of the mineral resources.

The role of water in the future development and utilization of the fossil fuels and the large low-grade mineral resources in Utah is staggering. Such proposals as the North American Water and Power Alliance (NAWAPA, whereby Alaskan and Canadian water surpluses could conceivably be diverted into the conterminous United States) are needed if the full mineral development is expected. Utah could receive as much as 6,900,000 acre-feet of water per year from the project should it become a reality. The planners estimate that at least 15 years would be required to reach agreements and solve legal questions which would exist between nations, states, counties, municipalities, and other water users. Some say a "start" now may be just about too late.

ASSN. BACKS BILL

The Western States Land Commissioners' Assn. organized a legislative committee to push for passage of a bill authorizing earmarking of 50 per cent of federal income from public land leasing for support of public schools and to back a bill which would give Utah title to lands lying below the meander line of Great Salt Lake. They also asked the Interior Secretary and the Bureau of Land Management to "apply, as required by law, a liberal, rather than restrictive, construction in favor of the states of the various land grant laws and indemnity selection laws." (Management Digest, Utah Mining Association, Vol. 18, 22, November 18, 1964, Page 2.)

High and Dry

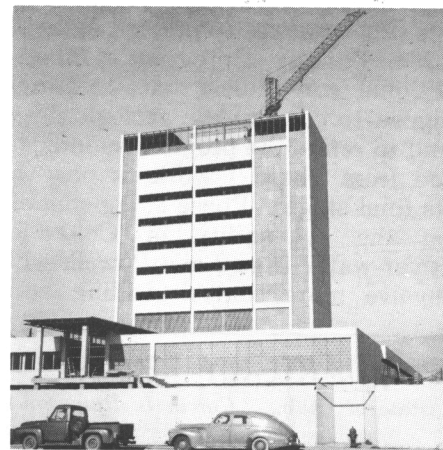
The communities along the Wasatch Front and on drainages of watersheds with above average precipitation for late 1964 and early 1965 should be encouraged to appraise the general condition of their flood-control systems and their flood control capabilities, such as availability of equipment and sand bags.

ENGINEERING GEOLOGY

Except statistically, engineering geology is not yet able to predict the time of occurrence of natural disasters. But it can be used to point out areas where the probability of economic losses, or of disaster, is especially great. Therefore, the Utah Geological Survey intends to present a series of reports pertaining to engineering geology within Utah.

As applied to urban areas it is hoped that on one hand they will explain the geologic evidence which pinpoints areas that have been affected by such natural forces as runoff, landslides, subsidence, and earthquakes; on the other hand that they may eventually prove an aid in the implementation of prudent laws and regulations designed for public health and safety.

Two of these reports, Special Studies 10 and 11, "Foundation Characteristics of Sediments in a Selected Portion of the Salt Lake Metropolitan Area" and "Engineering Implications and Geology, Hall of Justice Excavation, Salt Lake City, Utah," will soon be available from the Utah Geological Survey.



Metropolitan Hall of Justice
January 1965

This structure sits in the center of an area described in "Special Studies 11, Engineering Implications and Geology, Hall of Justice Excavation, Salt Lake City, Utah". This paper is the first of the Special Studies which is oriented in the field of Urban Geology. The price will be \$1.25 and the release will be in late February or mid-March.

TOPOGRAPHIC MAPPING IN UTAH

Topographic mapping is needed for all facets of natural resource management and for the improvement of communication, transportation, and public safety. Yet, within the State of Utah, thirty-one per cent of the land has yet to be mapped. (The status of Utah's topographic coverage is shown on the chart located to the left below.) The Great Salt Lake, its desert, and the potentially important Sevier Lake areas, are large land fragments with little or no map coverage; a large portion of Uintah and Grand Counties, with their shallow oil-shale deposits, are part of the topographic void; and Rich County, with its phosphate potential, has virtually no topographic coverage.

In addition to being an aid in the promotion of the mineral industry, topographic maps are of great value in locating roads, highways, and cross-country utilities. More and more, as public health and safety come to the forefront, it is topographic coverage, in conjunction with techniques of urban and engineering geology, which makes

possible the best site selections for such public facilities as dams, reservoirs, treatment plants for water and sewage, etc. Flood potential of urban and metropolitan areas can be recognized by interpreting topographic maps and correlating watershed conditions and configurations with climatic cycles.

To expedite the topographic mapping program in Utah is to benefit communications, transportation, public safety, and the mineral industry. The expediting of public safety alone could save public funds merely by locating schools and public works in places less susceptible to natural disasters. The development of the mineral industry and the servicing of the entire state with a good communication, transmission, and transportation network invites additional industry, and these foster a greater tax base with less unemployment and welfare.

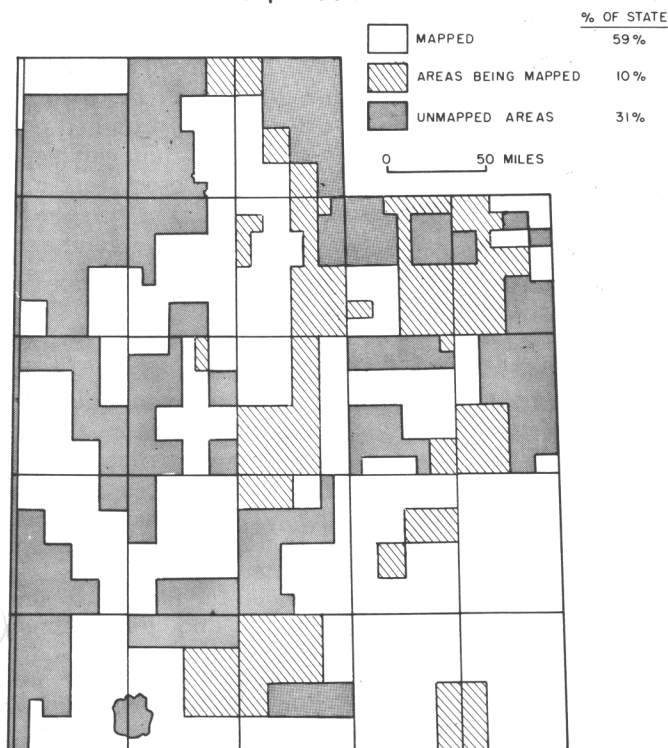
Sixty-nine per cent of the State is topographically mapped, and Utah's contribution to date has been \$68,462.00 toward this accom-

plishment. This gives Utah a rating of 36th among the 48 conterminous United States.

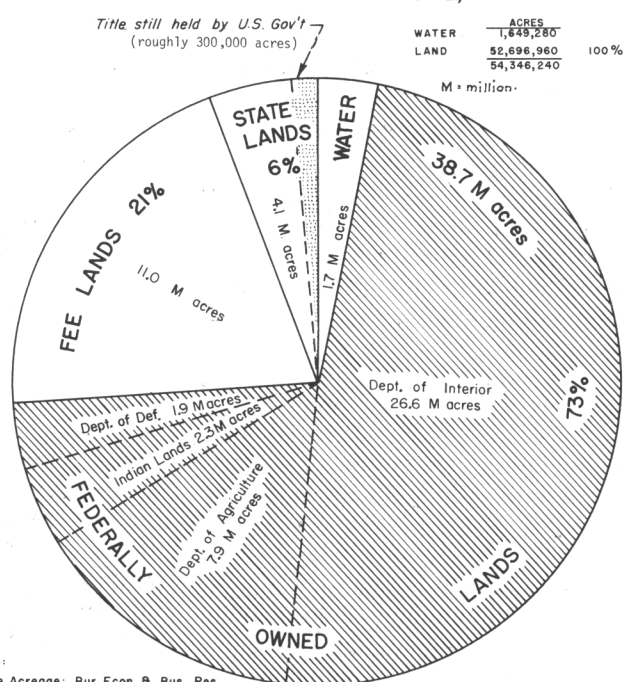
Seventy-three per cent of the State is federally owned, whereas 27 per cent is in state or private ownership (see chart on the right, below). It seems that the Federal Government has just about accomplished the mapping of that proportion of the percentage of lands which it controls; therefore, the State certainly would be justified in assisting in the mapping of the remaining 31 per cent, of which 27 per cent is in taxpayer status or is State owned.

The Utah Geological Survey proposes that \$50,000 per year be expended on topographic maps. This amount, in addition to the normal U. S. Geological Survey program, will be matched by the Federal Government and ten additional quadrangles per year will be published. With this matching program, in a four-year period, the maps needed to cover the area around Great Salt Lake would be well on their way to publication.

TOPOGRAPHIC MAPPING IN UTAH
Sept. 1964



UTAH LAND OWNERSHIP
JUNE, 1964



Source:
 State Acreage: Bur. Econ. & Bus. Res.
 Indian Lands: Utah Public Lands P.8
 Bur. Econ. & Bus. Res. March 1962
 Balance: Statistical Appendix Ann. Rept.
 of Director, Bur. of Land Man. 6/30/61

UTAH'S MINERALS NEED HELP

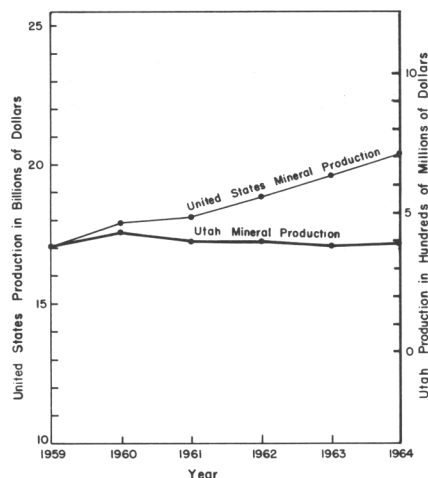
By Robert E. Cohenour

The development of Utah's mineral potential is becoming more and more dependent on access and on the availability of water. Utah's situation, however, is not so different from that of many other water-short mineralized areas of the United States and the World. In the United States there is a growing tendency to orient the "multiple use" concept to include only conservation and recreation activities; whereas mining, rights of access, and other mineral-related activities are being frozen out by low-level administrative restrictions and regulations. It appears that it is more important to preserve a wilderness or a clear trout stream by restrictions — and to further enhance them by studies of the ecology and the mating habits of birds, beasts, and fish — than to assist a mining industry dedicated to modern living. It would seem that conservation researchers should be somewhat oriented toward assisting the extractive industries in furthering the economy.

It is suggested that friends of the mineral industry should dedicate themselves to the preservation and promotion of the mineral industry. This might be done by forming groups, headed by emeriti, which are oriented about 180 degrees out-of-phase with existing conservation groups, but with considerably more understanding for problems of conservation than existing groups have demonstrated for problems of the extractive industries.

One does not need to cast very far to realize that Utah's faltering economy and high tax burden (the highest in the Western States) are in part associated with the neglect of the mineral industry. Utah's interest has been mainly with agriculture and grazing, while mining has been relegated to secondary importance even though the tax base fos-

tered by minerals has exceeded that of agriculture and grazing. It would seem that Utahns should heed the message of the following graph showing an overall domestic growth trend greater than Utah's. This seems odd because Utah is acknowledged as a territory well endowed with mineral riches.



The citizens are taking first steps to bolster the economy by a stepped-up program of tourist and recreational promotion. Such a program will probably give immediate results, but in the long run, a bolstered mineral base attached to healthy industrial environment will be greater in value.

Utah's officials presently are engaged in a great series of decisions, namely: Should the role of water be overwhelmingly oriented to agriculture and quasi-reclamation, or should there be a 50-50 split with industry and the extractive industries? Unfortunately, Utah, with poor agricultural growth potential, is deeply attached to the agricultural philosophy, so much so that the allocation of water to a billion dollar electric industry is jeopardized. When an industry which employs over 2,000 people and possesses multi-millions of dollars in taxable assets can be turned away because of agricultural antipathy, Utahns should begin to ask themselves what is best for the economy of their state.

GEOLOGIC FIELD TRIP SLATED FOR SOUTHERN UTAH

The Utah Geological Society and the Intermountain Association of Petroleum Geologists have combined efforts this year to conduct a joint field conference. Covering many of the remote scenic areas of southern Utah, it will be oriented toward the area's energy potential.

The proposed field trip will retrace some of the route of the 1963 I.A.P.G. trip, but will reach into the desolate Kaiparowits coal region east of Bryce Canyon National Park, and will stop at the Upper Valley oil field currently being developed.

A guidebook is being prepared which will contain papers by acknowledged authorities on the stratigraphy, structure, and economic products of the region. Coal, oil, and water, of current interest, will receive special attention. Prospective authors should contact the guidebook editors: Messrs. Harry D. Goode or Richard A. Robison, College of Mines and Mineral Industries, University of Utah, Salt Lake City, Utah.

The tentative date for the field conference is September 17-18, with registration in Cedar City on the evening of September 16. It is hoped that buses can be used instead of private cars, provided that buses can be found that can negotiate some of the desert roads on the proposed route. For further information regarding the field conference contact the field-trip chairman, Mr. Parker Chipman, Marathon Oil Company, Box 268, Salt Lake City, Utah.

Recent discussions concerning the potential uses of Great Salt Lake and its management have neglected the oil and gas potential. Oil seeps at Rozel Point indicate that management plans for the lake must be sufficiently flexible to permit exploration and development of this unknown potential. Charles E. King completed a shallow well at Rozel Point at the beginning of the year. It reportedly produces 5 bbls of oil a day.

UTAH'S SURVEY AND THE MINERAL INDUSTRY

General Background

The Utah Geological and Mineralogical Survey was authorized by an Act of the Utah State Legislature in 1931, but at that time no operating funds were made available for the Survey's establishment. As a result, from 1931-1941 Utah had an authorized geological survey which was, to all intents and purposes, non-existent.

When Governor Herbert B. Maw was elected in 1941, a "new deal" reorganization of state government grouped the Utah Geological Survey with several other state agencies (among them, the Utah State Planning Board and the Utah State Parks Commission), and placed them under the Utah State Department of Publicity and Industrial Development, a newly conceived agency which was designed to help bring more tourists and new industries to the State. The Utah State Department of Publicity and Industrial Development was given a generous appropriation, and the actual history of the Survey began at this point.

Arthur L. Crawford, who at that time was associated with the University of Utah Experiment Station, was furnished by the University to the Geological Survey to be Senior Investigator, and Alfred M. Buranek, a Brigham Young University graduate, was hired by the U.P.I.D. as Junior Geologist. These two men worked as a team investigating the strategic minerals of the state, then in need of research because of World War II. The results of their investigations were edited and published by the University of Utah as bulletins and circulars under the joint sponsorship of the Utah Engineering Experiment Station and U.P.I.D.

In 1946 Governor Maw appointed Arthur L. Crawford to serve as a Commissioner on the three - man U.P.I.D. Commission, and asked him to give the Utah Survey his personal attention. The Survey staff now consisted of Buranek, and Mendell M. Bell, a University of Utah graduate, who was given the

assignment of investigating the oil and gas possibilities of the State. Buranek was to supervise the investigation of all other minerals within the State. Through the U.P.I.D., the Survey had a budget which permitted the granting of modest stipends to graduate students at the various Utah universities and to others doing specific geologic work.

The 1949 legislature denied an appropriation to the U.P.I.D., but salvaged the Survey and transferred it to the College of Mines and Mineral Industries at the University of Utah, where it was given an appropriation sufficient only for a Director and Secretary, and a small allowance for postage and supplies. Arthur L. Crawford was appointed the first Director of the Survey and served until 1961. He published the results of gratis research conducted by many in the mineral industry, and disseminated these studies through the sale of publications.

The survey was aided by the University of Utah Research Fund, and through these monies the Library of Samples for Geologic Research was established in 1951 for the collection of well cores, cutting samples, electric logs, and other data.

In 1961 Dr. William Hewitt, formerly with the American Smelting and Refining Co., was appointed as Director of the Survey. In 1963 the legislature allocated to the Survey for research, 2.97 per cent of the mineral leases, rentals, and royalties returned to the State from the Federal domain.

Presently, the permanent staff of the Survey consists of six employees: 3 technical (W.P. Hewitt Geologist-Director; R. E. Cohenour, Research Geologist; and E. B. Heylman, Fossil Fuels Geologist), 1 Secretary-Office Manager, 1 Secretary-Accountant, and 1 Editor (50% of full time). In addition, student draftsmen, student manuscript typists, and student chemists are employed on a time-card basis. Qualified technical help and temporary field assignments are employed for limited periods and for specific assignments.

Through a series of cooperative projects with the United States Geological Survey and the United States Bureau of Mines, the Utah Survey has been able to utilize the trained personnel and laboratories of these organizations, and thereby undertake programs that otherwise could not have been started. These studies are conducted by Federal Government employees. The Utah Survey merely contributes financial assistance. The Utah Survey has also maintained close liaison with the College of Mines and Mineral Industries in the latter's mapping program in Beaver County.

The Utah Geological and Mineralogical Survey is a service agency. Its purpose is to promote the development of the State's mineral resources. It has no regulatory duties. Its field geologists are enjoined to cooperate with prospectors, but are not to encroach upon the field of professional consultants. Furthermore, it is firmly understood that no Survey employee is to benefit from State lands while in the service of the Survey, nor for a 2-year period thereafter.

Legal Obligations

The *Utah Code Annotated 1943*, Vol. 2, Title 34, as amended by chapter 46 *Laws of Utah 1949*, provides that the Utah Geological and Mineralogical Survey "shall have for its objects":

1. The collection and distribution of reliable information regarding the mineral resources of the State.
2. The survey of the geological formations of the State with special reference to their economic contents, values and uses, such as: the ores of the various metals, coal, oil-shale, hydro - carbons, oil, gas, industrial clays, cement materials, mineral waters and other surface and underground water supplies, mineral fertilizers, asphalt, bitumen, structural materials, road - making materials, their kind and availability; and the promotion of the marketing of the mineral products of the State.
3. The investigation of the kind, amount, and availability of the vari-

Utah Survey—Continued

ous mineral substances contained in State lands, with a view of the most effective and profitable administration of such lands for the State.

4. The consideration of such other scientific and economic problems as, in the judgment of the Board of Regents, should come within the field of the Survey.

5. Cooperation with Utah state bureaus dealing with related subjects, with the United States Bureau of Mines, in their respective functions and distributions of reports and bulletins embodying the results of the work of the Survey.

6. The preparation, publication, distribution and sale of maps, reports and bulletins, embodying the results of the Survey. The collection and establishment of exhibits of the mineral resources of Utah.

7. Any income from the sale of maps and reports or from gifts or from other sources for the Survey shall be turned over to the State Treasurer and credited by him to a fund to be known as the Survey Fund to be used under the direction of the Director of the Survey for publication of maps, bulletins or other reports of investigation of the Utah Geological and Mineralogical Survey.

Accomplishments

Since the winter of 1962-63, the Survey, at the request of the State Land Board, has dedicated 245-man days to analyzing specific geologic problems presented by the Land Board, and, on its own initiative, has recommended to the Governor's Advisory Committee on Lieu Land Selection some 275,00 acres of Federal land as suitable for acquisition.

In the summer of 1963 investigations were undertaken on specific problems relating to Utah's hydrocarbons, and on specific structural conditions in the Deep Creek Mountains. In the spring of 1964, Dr. Lehi F. Hintze was engaged to update the Geologic Map Index of Utah (Utah Geological Survey Map 19, soon to be released).

Beginning in the summer of 1964, the Survey embarked on the following programs of field inspection:

1. Mineral reconnaissance studies of Garfield, Wayne, Piute, Sevier, and Sanpete Counties.

2. A study of the State's saline deposits: In 1964 a deep drill hole was sunk in the center of the Salt Lake Desert, and 2 ft. samples were collected at 20 ft. intervals; and core and brine samples were collected from shallow holes over a small portion of the desert.

3. Mapping of the asphaltic sands of Asphalt Ridge, Uintah County.

4. Detailed study of the mineral deposits of the Deep Creek Mountains.

5. Urban geology study: The Survey employed a graduate student to commence a program of salvaging foundation drill-test data, obtained through the cooperation of architects and civil engineers, and interpreting same.

In addition to field studies, the Survey established a small analytical laboratory, staffed by graduate students, for determining the saline contents of brines and sediments. The Survey is also supporting, with financial assistance, the following laboratory investigations:

1. An analysis of Dr. Wm. Lee Stokes of the Univ. of Utah of the fracture patterns of the State's mineralized belts as interpreted from the State Geologic Map.

2. A study by the University's Department of Fuels Technology of the chemical characteristics of Utah's shale oil, with Sample Library material involved.

3. A study by a doctoral candidate of the reservoir rocks of the newly discovered Kaiparowits oil field, with Sample Library material involved.

The Library of Samples for Geologic Research has added since October, 1963, 630,000 ft. of oil well samples from 166 wells, making a total collection of 9,000,000 ft. and 1,820 wells. Also the Library has 7,500 ft. of water well samples (50 wells) and 1,500 ft. of foundation test borings (50 wells).

Cooperative projects with the United States Geological Survey are as follows:

1. Compilation of mineral and water-resources of Utah (data published as Bulletin 73).

2. Dissolved mineral inflow to Great Salt Lake.

3. Chemistry of Great Salt Lake brines.

4. Chemical characteristics of waters in western Utah.

5. Springs of Utah, with special attention to their thermal properties.

6. Chemistry of water entering Sevier Lake.

Cooperative projects with the United States Bureau of Mines include the following:

1. Economic statistics of Utah's mineral production.

2. Collection of oil-field brines (in cooperation with personnel of the Oil and Gas Commission for chemical analysis).

The manuscripts which are released as publications of the Survey are obtained from various sources: from Survey projects, from field work accomplished by personnel of the College of Mines, from the United States Geological Survey, and in large measures from gratis contributions. A list of available publications may be obtained by writing to the Office of the Utah Geological Survey, 103 Civil Engineering Building, Univ. of Utah, Salt Lake City, Utah 84112.

What the Survey Can Do for Utah

With support, the Utah Geological Survey will concentrate on the following items:

1. Extend the field evaluations of State lands.

2. Extend the mineral inventory of county resources to complete three to five counties per year.

3. Institute a program for completion of the topographic mapping of the State, on a cooperative basis with the United States Geological Survey, with special initial emphasis on lands adjacent to Great Salt Lake.

4. Study specific mineralized areas not now in production, among them: tar sands, salines, shale oils, coal, beryllium, idle mining camps.

5. Study densely urbanized areas for geologic hazards: ground water, landslides, flood potentials, and the relation of public buildings, utili-

Continued on Page 8, col. 2

Southern Utah Coal

Continued from Page 1

\$930,750 to the Utah school system annually.

Phases 1 and 2 indicate that a favorable reserve of coal exists on the holdings of Resources Company and Associates. Estimates of the recoverable coal, based on a minimum thickness of 4 feet with at least 50 feet of support between workable beds and with recovery factors of from 33 to 50 per cent of the mineable reserve, range from 500 to 612 million tons, or between 7,143,680 and 8,742,400 tons per square mile.

The Cretaceous coal measures in this area generally are dispersed in all of the formations, which from oldest to youngest are: Dakota Sandstone (100+ft.), Tropic Shale (300-600 ft.), Straight Cliffs Sandstone (1,100-1,150 ft.), and the Wahweap Sandstone (0-1,000 ft.). The more important coal measures lie 400-1,000 feet beneath the top of the Straight Cliffs Sandstone, which forms the surface in this area. Ranging from 300 to 600 feet in thickness; of these, as many as 6 beds more than 4 feet thick were found. Some areas contain individual beds more than 25 feet thick.

Preliminary work indicates that the quality of the coal is fairly consistent from bed to bed throughout the area. The range of analyses for dry coal are:

	Range	Avg.
Btu/pound	11,698-13,746	12,981
Ash (%)	3.60-16.70	8.09
Fixed Carbon (%)	43.70-55.45	49.67
Volatiles (%)	37.21-45.80	42.24
Sulfur (%)	0.47- 1.50	0.95

Based on the above figures and on outcrops, the Utah Geological Survey is bold enough to presume that one half of the remaining 1,430 square-mile area in the Kaiparowits coal field could contain recoverable coal in excess of 700,000,000 tons per square mile, or as much as ten thousand million tons of recoverable coal, which vastly exceeds the U. S. Geological Survey's 1960 estimate.

WELL FIRE EMPHASIZES SHALLOW GAS POSSIBILITIES

On December 18, 1964, a gas blow-out occurred at the Pacific Natural Gas No. 1-13-2 Horseshoe Bend-State well, section 2, T. 7 S., R. 21 E., Uintah County, Utah. The blow-out occurred while a formation tester was being pulled from the hole. The blow-out preventer was closed, but apparently the casing ruptured below the preventer, permitting an unrestricted flow of gas. The gas ignited, and flames shot over 50 feet into the air. Fortunately, there were no injuries. The gas flow, which completely destroyed the drilling rig, was estimated at 2,500,000 cubic feet per day. The loss of the rig has been estimated at \$250,00. The gas flow died on December 28, leaving a charred mass of tangled iron in an

area which had cratered to some extent.

One interesting fact concerning this well is that the high-pressure gas zone was a sand at a depth of approximately 3,200 feet in the Tertiary Uinta Formation. Although there is other Uinta gas production in the Uintah Basin, this occurrence indicates that there could be considerable gas in the more shallow zones. The principal objectives for oil and gas drilling in the Uintah Basin have been the deeper sands in the Green River and Wasatch Formations, but the possibilities of the Uinta Formation have been generally overlooked.

1964 MINERAL INDUSTRY

The U. S. Bureau of Mines reports that the value of minerals in Utah was \$392.5 million in 1964, an increase of \$7 million (2 per cent) over 1963. Increases of \$13.6 million and \$1.5 million were reported for metals and non-metals, respectively; whereas the fossil fuels decreased by \$8.1 million. Metals comprise 57 per cent of the total value, fossil fuels 33 per cent, and non-metals 10 per cent.

Increased prices and increased production caused improvement in the status of gold, iron ore, uranium, and vanadium.

Copper amounted to 58 per cent of the total metal production value and 33 per cent of the entire mineral production value of the state.

Petroleum, comprising 62 per cent of the fossil fuels value, was \$11.3 million less than in 1963, a decrease of 12 per cent. Gilsonite, coal, natural gas, and liquified petroleum gases gained in value.

Production of cement, sand and gravel, and stone accounted for more than half of the non-metallic value. Fluorspar, lime, perlite, potassium salts, pumice, and salt gained in value, whereas clay and phosphate declined.

NOT ENOUGH COPPER EGGS IN THE BASKET

The Utah Copper Division, Kennecott Copper Corporation, the major producer of metals in Utah, was strike bound for 80 days in 1964. This strike idled 6,000 men of the division, and economists calculate that the state and local tax losses amounted to approximately \$2,560,000. It is significant that this single company contributes approximately \$11,680,000 annually in State and local taxes.

In 1963 Utah's mineral industry provided for more than 21 per cent of the assessed valuation in the entire state, or about \$304 million dollars. Further, the taxes collected from mineral producers exceeded \$23 million (Kennecott's contribution is 50.8% of the total). Nearly \$17 million was from property tax assessed on mining property, or about 16 per cent of the total property tax.

It appears that a broad expansion in Utah's mineral industry is needed, especially when one considers that Utah is so dependent tax-wise, upon raw materials for sustaining her economy.

PROGRESS ON ASPHALT RIDGE

The release date of the bituminous sandstones report on the Asphalt Ridge area near Vernal, Utah, has tentatively been set as early May, 1965. The completed report will include a large scale geologic map, the results of numerous analyses of the bitumen and of the host sediments, estimates of reserves, and information on wells which have been drilled in the area. Drafting of the final geologic maps is currently in progress. These maps will show in detail the general geology and structure, and the thickness, lateral extent, and degree of saturation of the bituminous sands in the Asphalt Ridge area.

The analysis of the bitumens includes two standard crude petroleum analyses on samples from widely separated parts of the ridge; two ultimate analyses, giving the carbon, hydrogen, and nitrogen content of the bitumens; two proximate analyses, giving the ash content, volatile matter, and fixed carbon content of the bitumens. An emission spectrophotographic analysis of the ashes to determine the trace element content will also be included.

Outcrop samples of the bituminous sandstone (representative of each saturated formation have been analyzed to determine the porosity, permeability, residual oil and water saturation, and the gallon per ton yield. This information, together with map information, will be used to estimate the bitumen reserves in the area. Other analyses include thin - section analyses, grain - size analyses, and x-ray analyses of the clay sized fraction of the sediments.

Lithologic logs of seven wells drilled in the Asphalt Ridge area have been placed on open file and are available for public inspection in the Office of the Utah Geological and Mineralogical Survey. Most of these logs have not been readily available in the past. Copies of the logs will also be included in the Appendix of the Asphalt Ridge report. A list of the well names may be obtained by writing the Survey Office, 103 Civil Engineering Bldg., University of Utah, Salt Lake City, Utah, 84112.

Governor Rampton Steps Forward on Great Salt Lake Development

Gov. Calvin L. Rampton is aware of the vast recreational and industrial potential of Great Salt Lake. The Salt Lake Tribune Feb. 4, 1965 reports that, as a result of a meeting with two groups of citizens interested in the Saltair resort restoration and in the protection, planning, and development of Great Salt Lake, the Governor will call a public hearing about April 1, 1965. The hearing will include all of the State agencies and citizens directly concerned with the Lake. Tentatively, U. S. Senator Moss and interested federal agencies will be invited since Senator Moss has introduced federal legislation which would make Antelope Island a national monument.

The Governor is to be commended for prodding this giant, so long sleeping at the fringes of an apathetic citizenry. Official interest appears to be sufficiently strong to give the Lake its long needed development plan. Gov. Rampton is interested in the development of the lake's potential and does not intend to become mixed in the conflicts of various groups. Further, he pointed out the importance of the Kennecott Copper Corporation in the state's economy and indicated that if its mill tailings could be used for dike construction without hurting the public interest then it should be done. During the meeting the Governor indicated that the development of Great Salt Lake was important and that he might consider the calling of a special legislative session to work on the problem.

Utah's Survey

Continued from page 6

ties, and structures to earthquake problems.

6. Initiate applied research on principles leading to development of Utah's mineral resources.

7. Directly support State offices dealing with geologic and mineralogical problems.

UTAH LANDS

Max C. Gardner, Director of the Utah State Land Board, reports:

"The Land Board, at its meeting on January 19, 1965, rejected the application of H-K (Hogle-Kearns and National Lead) for an extension of exclusivity under its royalty agreement and the petition of H-K for a grant of an exclusive exportation right in connection with magnesium chloride produced from brines of the Great Salt Lake. At its meeting on Thurs., Jan. 21, 1965, the Land Board unanimously passed a resolution indicating that the application of Lithium Corporation of America for magnesium chloride rights at such time as the H-K exclusive expires would be granted after adoption of rules and regulations governing the leasing of minerals in brines of the Great Salt Lake. The Board's resolution also indicated that upon adoption of rules and regulations, consideration would be given to the numerous pending applications for mineral rights and for land leases in connection with the Great Salt Lake.

We are attempting to have rules and regulations prepared and submitted to the Land Board for final adoption at its next regular meeting to be held on February 10, 1965. Suggestions for rules and regulations are being solicited from members of the Land Board and the Great Salt Lake Authority. These suggestions will be submitted to a committee of local attorneys and a member of the Land Board for discussion and drafting on February 1, 1965. The final product of the drafting committee will then be submitted to the Land Board at its regular meeting in February."

On February 3, 1964 a State Land Board committee completed a draft of "Proposed rules and regulations for mineral extraction rights on Great Salt Lake." The rules involving royalty agreements etc. will be considered and possibly adopted at a board meeting on February 12, 1964. Other State agencies will have had the opportunity to comment on the proposals along with industrial concerns.

The citizenry of the Beehive State must cease to stand solidly like the stellas of Stonehenge, guarding their water and agriculture, and let a well-behaved minerals industry assist in expanding the tax base.

Eighty per cent of the common geologic features and processes mentioned in college-level elementary geology textbooks are found or are in evidence within 30 miles of the University of Utah.